UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,004	07/10/2001	Yukihiro Yoshimine	P107336-00025	7630

7590 07/14/2005

ARENT FOX KINTNER PLOTKIN & KAHN, PLLC
1050 Connecticut Avenue, N.W., Suite 600
Washington, DC 20036-5339

EXAMINER	
PALADINI, ALBERT WILLIAM	

ART UNIT	PAPER NUMBER
2125	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/901,004	YOSHIMINE ET AL.	
	Examiner	Art Unit	
	Alan Diamond	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 October 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) 1-18 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 22 October 2003 and 10 July 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 10262004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on October 26, 2004 has been entered.

Claim Objections

2. Claims 7 and 16 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 7 does not further limit claim 2 because claim 2, via independent claim 1, requires that the resin film is formed to overlay an area including an array of the solar cells. Furthermore, as seen in claim 1, the resin film is formed so as to cover an area as large as or larger than the area of the array of solar cells. Furthermore, claim 1 requires that the resin film is between the front surface protecting layer and the rear surface protecting layer. Thus, the recitation in claim 7 that the resin film is overlaid on an area including at least the solar cells within the overlaying area of the front surface protecting layer and the rear surface protecting layer is already in claim 2 via claim 1.

Claim 16 does not further limit claim 11 because claim 11, via independent claim 10, requires that the resin film is formed so as to cover an area as large as or larger than the area of the solar cell. Furthermore, claim 10 requires that the resin film is between the front surface protecting layer and the rear surface protecting layer. Thus, the recitation in claim 16 that the resin film is overlaid on an area including at least the solar cell within the overlaying area of the front surface protecting layer and the rear surface protecting layer is already in claim 11 via claim 10.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, at line 3, it is not clear what is "surrounded on all sides by sealing resin". In particular, it is not clear whether it is the both the solar cells and moisture-proof resin film, or just the moisture-proof resin film. From the specification and independent claim 10, it appears that it is the resin film that is intended. It is requested that "moisture-proof resin film surrounded on all sides by" at lines 2-3 of claim 1 be changed to "moisture-proof resin film, wherein the moisture-proof resin film is surrounded on all sides by". The same applies to dependent claims 2-9.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 10-14, 16, and 17 are rejected under 35 U.S.C. 102(e) as being are anticipated by Kataoka et al (U.S. Patent 6,307,145), with evidence of physical properties provided by "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51) and "Common Shrinkage Values" from GE Polymerland.

Regarding claim 10, Kataoka et al discloses a solar cell module having a front surface protective layer **103**, a rear surface film **105**, and a solar cell **101** and resin film **108** sealed by sealing resin **102** and **104** (see col. 3, line 66 through col. 11, line 5; and Figure 1A). The resin film **108** is smaller than the front and rear surface protective layers **103** and **105** and covers an area as large as the area of the solar cell **101** (see Figure 1A). The sealing resin **102** covers the top surface and vertical surfaces of the resin film **108** (see Figure 1A). The sealing resin **104** covers the bottom surface of the resin film **108** (see Figure 1A). Thus, all sides of the resin film **108** are covered and surrounded by sealing resin **102** and **104**. Note that "covered with" at line 4 of claim 10 does not require that all surfaces of the resin film are directly contacting the sealing

resin. The sealing resin **104** clearly covers the bottom surface of resin film **108** (see Figure 1A).

As an alternative to Kataoka et al's resin film **108** corresponding to the instant resin film covered on all surfaces with the sealing resin, Kataoka also teaches a glass fiber nonwoven fabric **106** that is formed with resin binder, preferably acrylic resin binder (see Figure 1A; and col. 7, line 31 through col. 8, line 16). The glass fiber nonwoven fabric **106** can be called a resin sheet or film due to the presence of this resin binder. The nonwoven fabric **106** is covered on all surfaces by sealing resin **102** (see Figures 1A and 1B).

Regarding claims 11 and 13, the rear surface protecting layer **105** can be made using polyethylene terephthalate (col. 8, lines 40-42), a transparent resin that has a heat shrinkage rate of less than 1.0% (see "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51)). Although not a preferred embodiment, Kataoka et al teaches that a front surface protecting member made of glass is excellent in weathering resistance and is not permeable to moisture (see col. 1, lines 33-54). "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994).

Regarding claim 12, the resin films **105** and **108** are resistant to thermal expansion and thermal contraction and can be cross-linked to enhance heat resistance (see col. 8, lines 36-39; and col. 11, lines 1-4). Resin film **105** can be made using

polyethylene terephthalate (see col. 8, lines 40-42), which has a heat shrinkage rate less than 1.0% (see "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51)). Resin film **108**, or alternatively the binder for film **106**, is made of materials including acrylic resin (col. 10, lines 61-65), which has heat shrinkage rates less than 1.0% (see "Common Shrinkage Values" from GE Polymerland). (The heat shrinkage rate is an inherent property of materials.)

Regarding claims 14 and 16, the resin film **108**, or alternatively the film **106**, covers the solar cell and is formed inside from the edge of the overlaying area of the front surface protecting layer **103** and the rear surface protecting layer **105** (see Figure 1A).

Regarding claim 17, Kataoka et al teaches that glass, although not preferred, can be used as the front surface protecting member (see col. 1, lines 33-54). The module further comprises a rear surface protecting member **107** formed of a steel sheet, and a resin film **105** formed between the solar cell **101** and the rear surface protecting layer **107**, wherein the resin film **105** covers an area larger than the solar cell and smaller than the surface protecting layers (see Figure 1B; and col. 8, lines 48-54). Since the resin film **105** covers an area larger than the solar cell **101**, the resin film must cover at least a portion of the wiring which must be used to make use of the power generated by the solar cell.

Since Kataoka et al teaches the limitation recited in the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-5, 7, 8, 10-14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kataoka et al (U.S. Patent 6,307,145) in view of Tourneux (U.S. Patent 4,210,462), with evidence of physical properties provided by "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51) and "Common Shrinkage Values" from GE Polymerland.

Regarding claims 1 and 10, Kataoka et al discloses a solar cell module having a front surface protective layer **103**, a rear surface film **105**, and a solar cell **101** and resin film **108** sealed by sealing resin **102** and **104** (see col. 3, line 66 through col. 11, line 5; and Figure 1A). The resin film **108** is smaller than the front and rear surface protective layers **103** and **105** and covers an area as large as the area of the solar cell **101** (see Figure 1A). The sealing resin **102** covers the top surface and vertical surfaces of the resin film **108** (see Figure 1A). The sealing resin **104** covers the bottom surface of the resin film **108** (see Figure 1A). Thus, all sides of the resin film **108** are covered and surrounded by sealing resin **102** and **104**. Note that "surrounded on all sides by" at line 3 of claim 1 and "covered with" at line 4 of claim 10 do not require that all sides or surfaces of the resin film are directly contacting the sealing resin. The sealing resin **104** clearly covers the bottom surface of resin film **108** (see Figure 1A). Kataoka et al also teaches, "Another arrangement may be such that photovoltaic elements are integrated

on an insulated substrate to achieve desired voltage or current" (see col. 10, lines 50-54), i.e., a plurality of solar cell elements may be used on a single substrate, wherein a module made using the disclosed solar cell elements would have a resin film **108** covering the area including an array of the solar cell elements. It is the Examiner's position that the resin film **108** is a "moisture-proof" resin film in view of the resins that it is prepared from, and in view of the fact that it provides "humidity resistance" (see col. 10, line 56 through col. 11, line 5).

As an alternative to Kataoka et al's resin film **108** corresponding to the instant resin film surrounded on all sides by or covered on all surfaces with the sealing resin, Kataoka also teaches a glass fiber nonwoven fabric **106** that is formed with resin binder, preferably acrylic resin binder (see Figure 1A; and col. 7, line 31 through col. 8, line 16). The glass fiber nonwoven fabric **106** can be called a resin sheet or film due to the presence of this resin binder. The nonwoven fabric **106** is covered on all surfaces by sealing resin **102** (see Figures 1A and 1B). It is the Examiner's position that the nonwoven fabric **106** is "moisture-proof" and will at least provide some degree of moisture-proofness in view of the materials that it is made of, i.e., glass fibers in an acrylic resin binder (see col. 7, line 32 through col. 8, line 16).

Regarding claims 2, 4, 11 and 13, the rear surface protecting layer **105** can be made using polyethylene terephthalate (col. 8, lines 40-42), a transparent resin that has a heat shrinkage rate of less than 1.0% (see "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51)). Although not a preferred embodiment, Kataoka et al teaches that a front surface protecting member

made of glass is excellent in weathering resistance and is not permeable to moisture (see col. 1, lines 33-54). "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994).

Regarding claims 3 and 12, the resin films **105** and **108** are resistant to thermal expansion and thermal contraction and can be cross-linked to enhance heat resistance (see col. 8, lines 36-39; and col. 11, lines 1-4). Resin film **105** can be made using polyethylene terephthalate (see col. 8, lines 40-42), which has a heat shrinkage rate less than 1.0% (see "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51)). Resin film **108**, or alternatively the binder for film **106**, is made of materials including acrylic resin (col. 10, lines 61-65), which has heat shrinkage rates less than 1.0% (see "Common Shrinkage Values" from GE Polymerland). (The heat shrinkage rate is an inherent property of materials.)

Regarding claims 5, 7, 14 and 16, the resin film **108**, or alternatively the film **106**, covers the solar cell and is formed inside from the edge of the overlaying area of the front surface protecting layer **103** and the rear surface protecting layer **105** (see Figure 1A).

Regarding claims 8 and 17, Kataoka et al teaches that glass, although not preferred, can be used as the front surface protecting member (see col. 1, lines 33-54). The module further comprises a rear surface protecting member **107** formed of a steel sheet, and a resin film **105** formed between the solar cell **101** and the rear surface

protecting layer **107**, wherein the resin film **105** covers an area larger than the solar cell and smaller than the surface protecting layers (see Figure 1B; and col. 8, lines 48-54). Since the resin film **105** covers an area larger than the solar cell **101**, the resin film must cover at least a portion of the wiring which must be used to make use of the power generated by the solar cell.

The solar cell module of Kataoka et al differs from the instantly claimed solar cell module claims because Kataoka et al does not explicitly disclose a single resin film covering an area as large or larger than the area of the array of the solar cells, as recited in claim 1. As explained above, Kataoka et al discloses the use of a resin film **108** and nonwoven fabric **106** covering a single solar cell and having an area smaller than that of the protecting layers, as well as the use of a plurality of solar cells. Kataoka et al does not disclose the structure of the resin film or nonwoven fabric when a plurality of solar cells is used.

Tourneux teaches a solar cell module comprising a plurality of solar cells, front and rear protecting layers, and resin film layers positioned between the front surface protecting layer and the solar cells and the rear surface protecting layer and the solar cells (see Figures 3 and 4). The resin films are made materials including polyesters, epoxy resins, and silicone rubbers (see col. 2, lines 58-65). As seen in Figures 3 and 4, a single resin sheet covers an area greater than the area of the solar cell array (see Figures 3 and 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the module of Kataoka et al to use a single resin

film for Kataoka et al's resin film **108**, as taught by Tourneux, because using a single resin film would simplify the method of manufacturing the solar cell module by not requiring the formation of an individual resin film for each of the solar cell elements.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a single nonwoven fabric **106**, just as Tourneux uses a single resin sheet, to cover Kataoka et al's plurality of solar cells because using a single nonwoven fabric **106** would simplify the method of manufacturing the solar cell module by not requiring the formation of an individual resin film for each of the solar cell elements.

9. Claims 6, 9, 15, and 18 are rejected under 35 U.S.C. 1O3(a) as being unpatentable over Kataoka et al in view of Tourneux with evidence of physical properties provided by "Polyethylene Terephthalate (PET)" from *The Loctite Design Guide for Bonding Plastics*, Volume 2 (pp. 50-51) and "Common Shrinkage Values" from GE Polymerland, as applied above to claims 1-5, 7, 8, 10-14, 16, and 17, and further in view of Komori et al (EP 829909 A2).

Kataoka et al in view of Tourneux with said evidence is relied upon for the reasons recited above. The solar cell module described by Kataoka et al and Tourneux with said evidence differs from the instant invention because they do not disclose that Kataoka et al's resin film **108**, or alternatively nonwoven fabric **106**, is at least 3 mm from the edge of the front and rear protective members, as recited in claims 6 and 15, and that protruding wiring is covered with an insulating tape, as recited in claims 9 and 18.

Regarding claims 6 and 15, Komori et al discloses a specific example, wherein the front surface protective layer **404** was larger than the solar cell block by 90 mm on each side, the inorganic fibrous sheet **402** comprising the acrylic resin binder was larger than the cell block **401** by 5 mm on each side, the insulating resin film **407** was larger than the solar cell block by 15 mm on each side, and the rear surface protective layer **408** was larger than the solar cell block by 80 mm on each side (see page 9, lines 52-54; and page 10, lines 2-13). Therefore, the inorganic fibrous sheet **402** was about 75 mm from the edges of the front and rear surface protective layers and was larger than the solar cell block **401**, and the insulating resin film **407** was about 65 mm from the edges of the front and rear surface protective layers and was larger than the solar cell block **401**. Making the inorganic sheet **402** (**102**) smaller than the other layers "prevents the formation of a moisture migration path" (see page 4, lines 3-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the resin film **108**, or alternatively the nonwoven fabric **106** described by Kataoka et al and Tourneux to fabricate the module such that the resin film **108**, or alternatively the nonwoven fabric **106,** is set at a distance from the edge of the protective layers as taught by Komori et al because this improves the adhesion within the module and prevents the formation of moisture migration paths.

Regarding claims 9 and 18, Komori et al teaches the use of insulative tape **208** on a positive side terminal **206a** (see page 9, lines 11-13). Insulating electrical tape is commonly used to cover exposed wiring in electrical applications to prevent shod-circuiting and also to protect against electrical shock. For example, electrical tape is

extensively used by electricians and others making electrical connections because it offers a simple and efficient means of insulating exposed conductors.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module described by Kataoka et al and Tourneux to cover the wiring with insulating tape as taught by Komori et al because insulating tape provides a simple and efficient means for insulating conducting members.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
July 8, 2005